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ABSTRACT

The paper analyzes the impact of technology change on distance education, and the implications for training and distance education staff development. The paper suggests that one of the major areas for job training is in the selection of media and use of technology for instructional purposes, and in the procedures and processes of decision making. One model for doing this, based on the "ACTIONS" model, is suggested. It is noted that this model highlights such factors as access, costs, teaching functions, interaction, organization, novelty of the technology, and speed of change. It is recommended that a core of training materials on the application of technology to distance education be developed in the form of an open learning set of textual materials supported by audio, video, and computer self-instructional materials. (DB)

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THE COMMONWEALTH OF LEARNING

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APPLICATION OF NEW TECHNOLOGIES (INCLUDING COMPUTERS) IN DISTANCE EDUCATION:

IMPLICATIONS FOR THE TRAINING OF DISTANCE EDUCATORS

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Rationale

Introduction

Probably no other area of distance education is developing more rapidly than the application of technology to both teaching and administration. While most distance education still remains primarily print based, more and more institutions are moving to the use of electronic technologies, and even print-based distance learning is being dramatically changed by the application of electronic publishing techniques.

Perhaps more importantly, new technologies provide opportunities for developing new models of course design and administration. This in turn has major implications for funding, the organisational structures of distance teaching institutions, student support services, and above all training.

The rapid expansion of technologies for distance education

There is a very strong need for training in the application of technology to distance education. Tremendous pressure in the past has been put on developing countries by aid agencies and hardware manufacturers to invest in technology-based education projects, but the history of education, particularly in developing countries, is littered with the corpses of technology-based projects that were killed off because of the high operating costs, problems of adaptation to local conditions, lack of skilled personnel to operate the technologies, and lack of effectiveness. These lessons need to be understood before any organisation rushes in to use new technology.

At the same time, there has been a rapid expansion in the range and types of technologies available to distance educators. The more traditional technologies of broadcast television, radio, and audio-cassettes are not fully exploited, or have often been badly used in distance education. To these

older technologies and older type print production, though, the following new technologies are now increasingly available to distance educators:

- electronic publishing
- telephone teaching and audio conferencing
- audio-graphics
- video-cassettes
- satellite and cable TV
- computer-assisted learning
- electronic mail and computer conferencing
- video conferencing
- video-discs and CD-ROM

Each one of these technologies has already been applied to distance teaching somewhere or other, and some of these technologies are already becoming firmly established in some institutions. In many other cases, such technologies will be totally inappropriate, given local conditions, particularly in developing countries. Training is therefore required even in a negative sense, to be able to resist demands for the application of inappropriate technologies in a particular distance education context.

Reasons for increased use of technology in distance education

Nevertheless, there are several reasons why technology is likely to play an increasingly important and legitimate part in distance education, even - or especially - in developing countries:

- it can lead to reduced costs of course production and delivery, especially for courses with small numbers of students (<200 per annum)

- it can reduce costs of administration

- the move towards more decentralised, localised student support and course delivery, via learning centres

- a large-scale increase in work-based training

- a move away, for *educational* reasons, from 'traditional' distance education courses, with high front-end costs and long development times, to more 'on-line' and easily up-dated course design and delivery

Training implications

'Real-time' distance teaching, through inter-active live or video-recorded television broadcasts, and/or computer-conferencing, combined with set reading from text books and journal articles, can dramatically reduce the high 'front-end' costs of specially designed print-based courses, for courses with small student numbers, and can also increase student interaction and allow for flexibility in up-dating course material. Electronic publishing can dramatically reduce the cost of more traditional print-based courses, by reducing labour costs. In both cases, though, not only do existing staff have to be re-trained and in some cases new staff and facilities brought in, but to obtain such savings, major re-organisation of departments and changes to job specifications are also needed.

There is also a growing recognition of the importance of adequate local or inter-personal student support, in terms of direct contact with both 'human' counsellors and tutors, and with other students. This is leading to even greater importance being placed on local study or learning centres. Once these are established, the question arises as to what equipment, if any, should be placed in such centres. This in turn requires quite difficult policy decisions about the relative importance of course delivery through local centres or at home, and the extent to which students should be obliged to attend local centres. There are also major cost and security implications in placing equipment in local centres.

Lastly, the major growth area in terms of target groups for distance education over the next 10 years is likely to be in the field of vocational

training, and particularly work-based training. Often this will require training of workers in the use of the very technologies which can be used for delivering distance training, and especially computers. This means that in many cases, the technology will already be available where the worker training is to take place.

For all these reasons, training in the application of new technologies in distance education is essential. Furthermore, this training is required not only by those in the 'front-line' of technology applications (i.e. instructional designers, production staff) but also by senior managers and teachers, because of the need for clear policy regarding teaching approaches, organisational structures and financial control.

Staff training needs

This rather crude division between 'front-line' designers and production staff, teaching staff, and management will be used to identify different training needs.

The importance of context (or local conditions) for decision-making

In deciding on appropriate technological applications in distance education, context is all-important. Obviously, a very large and high-budget organisation such as the British Open University will be able to make very different decisions compared with a small extension unit in a poor, developing country. Even between developing countries with similar levels of economic development, decisions will differ according to geography, local technological infrastructures (e.g. availability of broadcast services), and educational structures. Lastly, even within a single institution, different decisions will be required between different areas of distance teaching, dependent on the needs of the target group and the teaching requirements of a course.

Furthermore, in educational and cost terms, there is no 'super-technology'; different technologies have different strengths and

weaknesses. This means then that a *combination* of technologies is usually the most appropriate decision, although the balance will vary from context to context.

There are also two quite different levels of decision-making. The first is the decision to set up a system of distance education based on certain technologies. This will involve heavy capital investment. The second level is how best to use such technologies once they are available. This means that general statements, like 'video-cassettes are better than satellite TV', are not helpful; it will all depend on the circumstance.

Choice of media: the need for a strategic approach

Perhaps the most important - and most difficult - training need in this area is the need for a set of procedures, or a check list of questions that need to be answered, irrespective of the type of institution or distance teaching programme, to enable appropriate decisions to be made regarding the choice and application of different technologies. Furthermore, the criteria for choice must be understood and applied by staff in each of the three categories defined.

The major problem here is the lack of generally agreed criteria for media selection in distance education, or even more fundamentally, a lack of appropriate theory or procedures. While there are numerous academic books on media selection in education, they do not in general suggest approaches that are either practical or relevant to distance education. Consequently, crucial decisions, both at a system level, and in terms of particular applications within a course, are made primarily for commercial, administrative or political reasons: the availability of a broadcast service; the offer of free or cheap equipment; the familiarity of academics with print as an instructional medium; the enthusiasm of a key decision-maker for a particular technology; the appointment of people with skills in a particular area, such as computer-assisted learning or video-production, and the need to maximise their services. In particular, once facilities and staff are in place, it is very difficult to change. When new technology is

introduced, it tends to be added on to existing media, rather than to replace more costly or less effective media.

While this is the reality of media selection in distance education, lessons have been learned. There are several different factors to take into account, which cannot be related to one another quantitatively. Thus in the end, an *intuitive* decision has to be made, but based on a careful analysis of the situation. Although there is no generally agreed set of procedures, I myself have suggested that decision-makers should use the acronym:

ACTIONS

as a guideline for decision-making:

- **A** ccess: where will students learn: home, work, local centres?
- **C** osts: capital and recurrent; fixed and variable
- **T** eaching functions: presentational requirements of the subject; required teaching and learning approaches
- **I** nteraction and user-friendliness: do students and teachers require a great deal of training to use this technology
- **O** rganisation: what changes in organisation will be required to facilitate the use of a particular technology?
- **N** ovelty: to what extent will the 'trendiness' of this technology stimulate funding and innovation?
- **S** peed: how quickly and easily can material be up-dated and changed? How quickly can new courses be produced using this technology?

(For more details of this, see Bates, 1989)

Awareness of the potential and limitations of different media

In terms of using different media, it is important to distinguish between the failure to exploit fully already existing media, and the need to increase

awareness of new technologies. In both cases, there is a need not only to develop critical frameworks for analysis along the lines indicated above, but to give people practical hands-on experience or 'prototype' examples of how technologies can be used.

For instance, in my own institution, we are about to embark on a series of 12 two-hour seminars on technology in distance education. In these seminars, we will make use not only of internal staff, but also of staff from local universities and appropriate visiting specialists. The first hour will be primarily a mixture of demonstration and analysis of a particular technology; the second hour will be mainly a discussion of the practical limitations and obstacles to using such technologies in our own institution. We are deliberately attempting to keep together the same group of approximately 30 people for all the seminars, and this group is drawn so as to include a wide range of people from both the institution and its partners (instructional designers, academics, course co-ordinators, graphic designers and editors, the librarian, student support services, the computer department, TV producers and programme co-ordinators). The aim is to develop a set of recommendations regarding:

a. particular technologies which we ought to be using over the next five to ten years

b. core teaching models for future courses, i.e. the main ways we wish to design and deliver courses over the next five to ten years

c. the necessary technological infrastructure to support the above

d. the necessary organisational infrastructure to support the above.

In addition, we are hoping to develop some in-house training materials from these workshops, using examples, previously published papers and books, and specially prepared notes, to be studied in an open learning

format by staff who were unable to attend the workshops. Also, for those technologies identified as core areas, further workshops will be organised.

Developing an appropriate curriculum should not be difficult. One outline, based on a course already taught to Masters' students in the Faculty of British Columbia, is attached as an Appendix, as well as the outline of the proposed series of seminars at the Open Learning Agency.

Problems and constraints

Some problems, such as the lack of agreed theories or procedures for media selection, and lack of trainers in this area, have already been mentioned.

The major difficulty though regarding technology in distance education is to do with the rapid developments that are taking place. This means that training needs to be continuous, over an extended period, and will need continuous revision. Also, it is difficult to train in this area without practical demonstrations. This may mean obtaining specialised equipment, such as computers or audio-graphics equipment, before commitments to establishing such systems have been made.

In some areas, there are well-established training programmes and opportunities, such as in broadcasting. With few exceptions (e.g. the BBC/ETV training course), though, the training is primarily technical, and does not address the key issues regarding distance education, such as costs, limitations of the media, etc., and in all cases is costly to provide, requiring travel and relatively long stays in a foreign country.

Lastly, there is a lack of recent good publications appropriate to training in the application of technology in distance education, particularly for developing countries. Many of the publications that do exist are case studies (such as a number of World Bank publications). Not only is it difficult to generalise from these, they are often cases where technology has been applied to on-campus teaching or schools (e.g. ETV or

educational radio projects). There is some literature available on some of the more recent distance education applications, but these tend to be scattered in journals or are internal documents, and are not always easily available. There is a good general introduction to non-print instructional media in the IGNOU course on Distance Education, but it does not go into enough detail for specialised training, particularly regarding more recent technological developments. There is a recent publication on media and technology in European distance education which gives a good overview of what is being done in Europe at the moment (Bates, 1990), but it is not in an appropriate form for training, other than as a reader. An important step would be the development of an appropriate bibliography on this subject.

Probably the most important constraint though is the failure within most distance teaching institutions to recognise the importance of providing training generally, and particularly training in the application of new technology. There is a good deal of hostility in many institutions to the use of technology. While there are often good reasons for this, sometimes the hostility is a result of fear or ignorance. Unless there is a strong management commitment to training in this area, (and hence a strong belief in the ultimate value of using technology), it will not happen.

Recommendations and suggestions

Training, while necessary, is expensive. Not only are there the direct costs of preparing curricula and materials, there is also the more major cost of the time of staff away from course design, production, delivery or administrative activities.

It is my view that what is needed is the development of a high quality 'core' of training materials on the application of technology to distance education, prepared largely as self-instructional materials, but in such a format, and with appropriate back-up materials, that the materials can be adapted for local use, and for group work locally. Because of the scarcity of good trainers in this area, and the rapidly changing nature of the subject

area, it is probably the only way that high-quality training can provided on an extensive basis.

I would see then a set of textual materials, supported by audio, video and computer examples, designed for self-instruction, but with the capacity for up-dating through the use of audio-conferencing and possibly E-mail and computer conferencing. As well as specially written materials, the textual materials would include a 'reader' of selected examples, and possibly one or two existing books. The material could form part of a Diploma or Masters course, and would probably require approximately 30 weeks part-time study (400 hours).

However, for such materials to be developed, a proper 'course proposal' is required, covering likely users, curriculum topics, teaching methods, a production schedule, methods of delivery, maintenance requirements, and a budget. This in itself requires a good deal of effort. Funding therefore needs to be found for this initial activity. If such a proposal was acceptable to a number of institutions (perhaps through a commitment to purchase materials and to assist with the design and delivery of such a course), a production team would need to be assembled, and advance funding found.

There is an obvious role here for the Commonwealth of Learning, as a broker and as a catalyst for raising funds. The course proposal could build on already existing contacts developed between IGNOU, Deakin University, the International Extension College, and the Open Learning Agency, although other partners should be welcomed.

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